

FCC PART 15 CLASS B

EMI MEASUREMENT AND TEST REPORT

For

**Designer Appliances Inc.
DynaPoint (Dong Guan) INC.**

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FCC ID: QMKQUILL

September 10, 2002

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Optical mouse - ITE
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Report Number: RSZ02082001	
Test Date: August 20, 2002	
Reviewed By: _____	
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Note: The test report is specially limited to the use of the above client company and the product model. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *Designer Appliances Inc.*'s product, model *The Quill* or the "EUT" as referred to in this report is an Optical mouse.

* *The test data was only good for the test sample. It may have deviation for other test sample.*

1.2 Objective

The following Class B report is prepared on behalf of *Designer Appliances Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules and regulations and to ICES-003 of the Canadian Interference - Causing Equipment Regulations.

The objective of the manufacturer is to demonstrate compliance with FCC Part 15 Class B limits for Information Technology Equipment.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2000, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corporation. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.4 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2000.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1400F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1998, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.5 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
R/S	Spectrum Analyzer	FSEM	849720/019	08/05/2003
HP	Amplifier	8447D	2944A09795	08/05/2003
ETS	Log Periodic Antenna	3146	9603-4421	09/05/2003
ETS	Biconical Antenna	3110B	3360	08/05/2003
Solar Electronics	LISN	TYPE 8012-50-R-24-BNC	21162	09/05/2003
Solar Electronics	LISN	TYPE 8012-50-R-25-BNC	21163	10/05/2003

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

1.6 Host PC Configuration Detail and List

Manufacturer	Description	Model	Serial Number	FCC ID
LEGEND	System PC	Qitian1200	N/A	N/A
Seagate	Hard Drive	ST 320410A	5FG2TFAX	DOC
Sony	3.5" Floppy Drive	FDD-MPF920-E	72930348	DOC
LEGEND	Motherboard	MS-6395	N/A	DOC
TELTA	SPS	DPS-145PB-111F	Lup0219016447C	DOC

1.7 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
KTC	CRT Monitor	7002FE	N/A	DOC
SAST	Modem	AEM-2100	0293	N/A
LEGEND	Keyboard	SK-1688	C2057790	DOC
HP	Laser Jet 5L Printer	C3941A	JPTV013237	DOC

1.8 External I/O Cabling List and Details

Cable Description	Length (M)	From/Port	To
Shielded KB Cable	1.6	KB	Keyboard
Shielded Cable	1.5	Mouse Port	Mouse
Shielded Serial Cable	1.2	Serial1	Modem
Shielded Printer Cable	1.2	Parallel	Printer
Unshielded Video Cable	1.5	VGA	Monitor

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, EMCTEST-H Program, contained on the hard drive, is auto starting on power-up. Once loaded, the program sequentially exercises each system component.

The sequence used is as follows:

- 1) Lines of Hs scroll across the VGA monitor.
- 2) The modem(s) receives Hs.
- 3) The printer output Hs.

This process is continuous throughout all modes tested.

2.3 Special Accessories

As shown in section 2.5, all interface cables used for compliance testing are shielded as normally supplied by *Designer Appliances Inc.*, and from their respective support equipment manufacturers. The VGA monitor, the printer, the modem and all other peripherals featured shielded metal connectors.

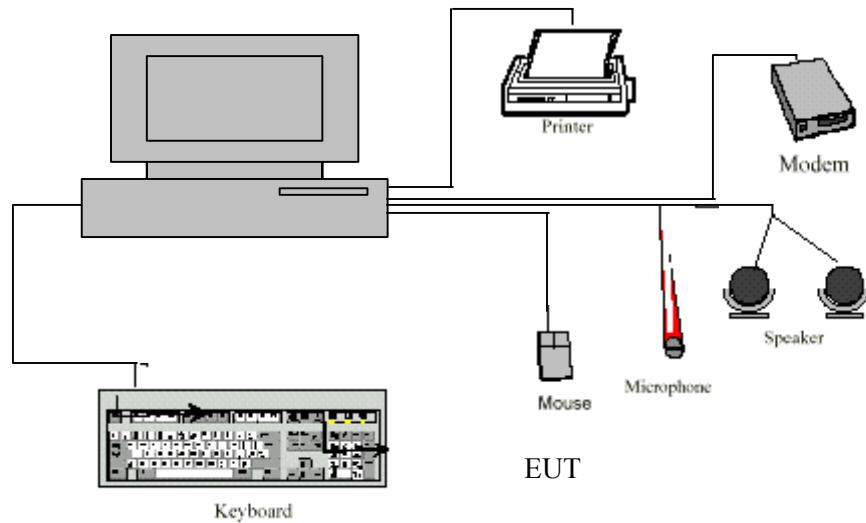
2.4 Block Diagram

Please refer to the Appendix D.

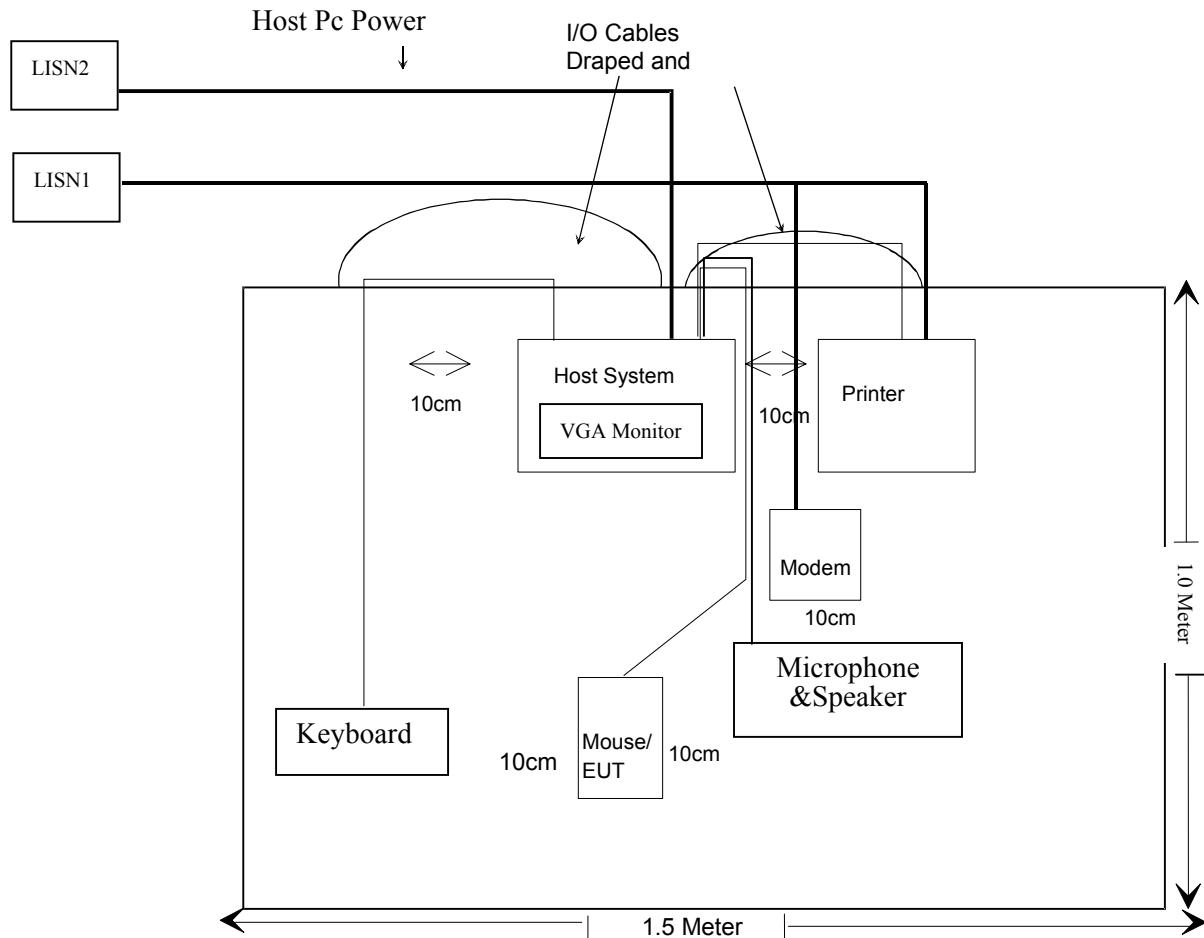
2.5 Equipment Modifications

No modifications were made by BACL to ensure EUT to comply with the applicable limits and requirements.

2.6 Configuration of Test System



2.7 Test Setup Block Diagram



3 - CONDUCTED EMISSIONS TEST DATA

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ± 2.4 dB.

3.2 EUT Setup

The measurement was performed at the **Open Area Test Site**, using the same setup per ANSI C63.4 - 2000 measurement procedure. The specification used was the FCC Part 15 Class B limits.

The Host PC system was placed on the center back edge of the test table with the monitor on its top. The printer and the modem were put on right side of the PC.

The keyboard was put directly in front of the Host PC and on the front edge of the test table. The mouse/EUT was placed along side with the keyboard. The rear of the mouse was flushed and bundled with the rear of the keyboard.

The external I/O cables were draped along the test table and flushed if necessary.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/ 60Hz power source.

3.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations:

Start Frequency.....	450 kHz
Stop Frequency	30 MHz
Sweep Speed.....	Auto
IF Bandwidth.....	10 kHz
Video Bandwidth.....	10 kHz
Peak Adapter Bandwidth.....	9 kHz
Peak Adapter Mode	Normal

3.4 Test Procedure

During the conducted emission test, the power cord of the host system and the EUT was connected to the auxiliary outlet of the first LISN. The VGA monitor and all other support equipment power cords were connected to the auxiliary outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dB μ V of specification limits). Quasi-peak readings are distinguished with a "Qp".

3.5 Summary of Test Results

According to the data in section 3.6, the EUT complied with the FCC Part 15 Conducted margin for a Class B device, and these test results is deemed as satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, with the *worst* margin reading of:

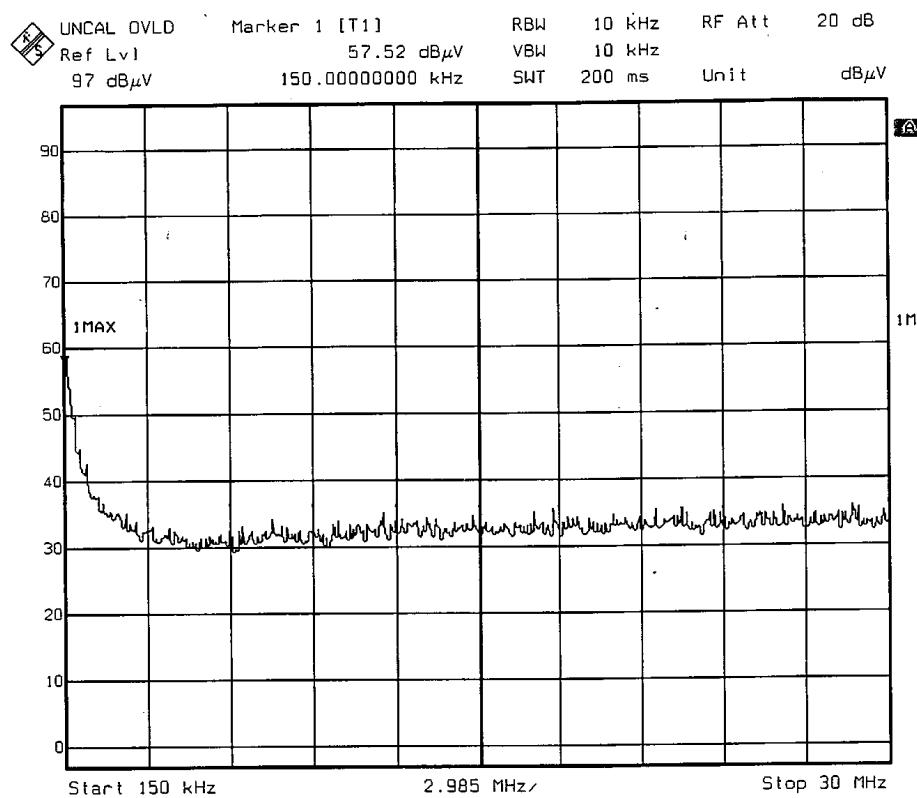
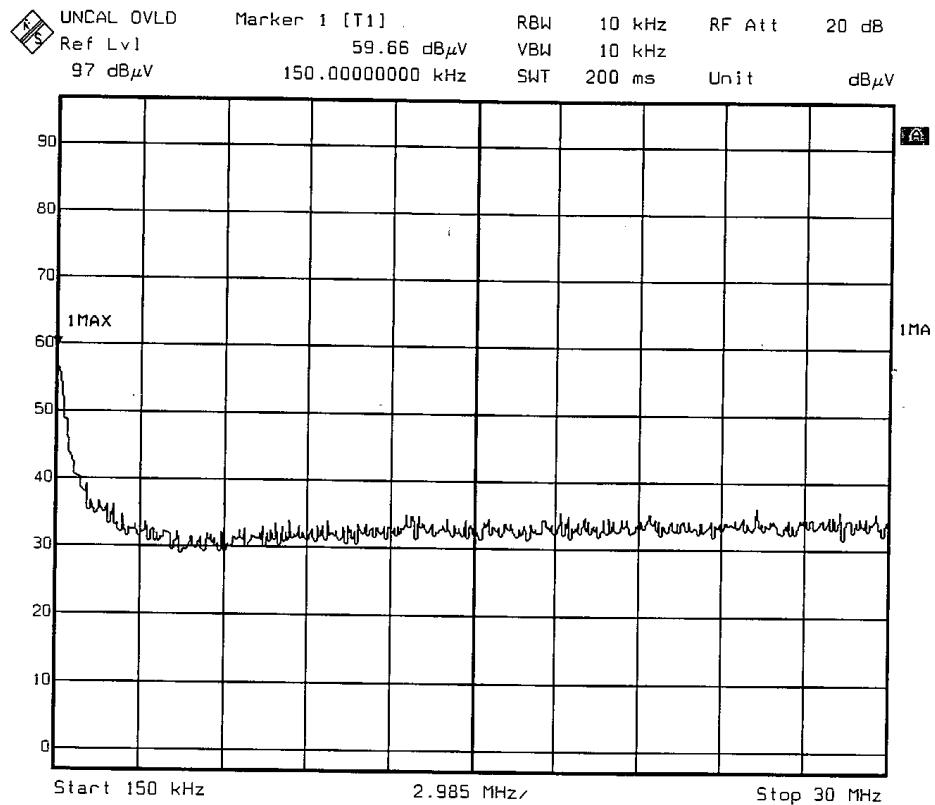
-2.1 dB μ V at 0.483 MHz in the Neutral mode

3.6 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dB μ V	Detector QP/Ave/Peak	Phase Line/Neutral	Limit dB μ V	Margin dB
0.483	45.9	Peak	Neutral	48	-2.1
1.242	35.8	Peak	Line	48	-12.2
9.486	38.1	Peak	Line	48	-9.9
9.49	38.9	Peak	Neutral	48	-9.1
15.902	35.9	Peak	Line	48	-12.1
0.45	45.5	Peak	Neutral	48	-2.5

3.7 Plot of Conducted Emissions Test Data

Plot of Conducted Emissions Test Data is presented hereinafter as reference.



4 - RADIATED EMISSION DATA

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ± 4.0 dB.

4.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4 - 2000. The specification used was the FCC Part 15 Class B limits.

The Host PC system was placed on the center back edge of the test table with the monitor on its top. The printer and the modem were put on right side of the PC.

The keyboard was put directly in front of the Host PC and on the front edge of the test table. The mouse/EUT was placed along side with the keyboard. The rear of the mouse was flushed and bundled with the rear of the keyboard.

The external I/O cables were draped along the test table and flushed if necessary.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/ 60Hz power source.

4.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the system was tested to 1000 MHz.

The spectrum analyzer was set with the following configurations during the radiated emission test:

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

4.4 Test Procedure

For the radiated emissions test, the power cord of the host system, VGA monitor and all support equipment was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT is compliant with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB μ V of specification limits), and are distinguished with a "Qp" in the data table.

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Class B Limit}$$

4.6 Summary of Test Results

According to the data in section 4.7, the EUT complied with the FCC Part 15 Class B standards, and these test results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, and had the worst margin of:

-7.0dB μ V at 37.55MHz in the Horizontal polarization, 30 – 1000MHz, 3 meters

4.7 Radiated Emissions Test Result

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15 CLASS B	
Frequency MHz	Ampl. dB μ V/m		Angle Degree	Height Meter	Polar H/V	Antenna dB μ V/m	Cable dB		Limit dB μ V/m	Margin dB
37.55	42.8	270	1.0	h	13.3	1.9	25	31.4	40	-7.0
113.45	38.3	45	1.0	v	11.7	3.2	25	29.2	43.5	-15.3
67.87	37.3	270	1.2	h	9.7	2.3	25	24.3	40	-15.7
68.8	38.2	0	1.2	v	9.7	2.3	25	24.2	40	-14.8
259.2	36.1	135	1.0	h	11.7	4.8	25	27.6	46	-18.4
260.5	36.3	270	1.2	v	11.7	4.8	25	26.8	46	-18.2